

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A fuel reforming device which generates reformat gas comprising hydrogen by reforming a mixture of a hydrocarbon fuel and air, comprising:
 - a fuel mixing chamber [(24)];
 - a fuel injector [(1)] which injects the hydrocarbon fuel into the fuel mixing chamber [(24)];
 - a first air distribution valve [(10)] which supplies air to the fuel mixing chamber [(24)] and generates an air-fuel mixture;
 - a second air distribution valve [(11)] which further supplies air to the air-fuel mixture in the fuel mixing chamber [(24)]; and
 - a reformer [(5)] comprising a reforming catalyst which generates reformat gas by causing the air-fuel mixture supplied from the fuel mixing chamber [(34)] to undergo reforming reaction, and an oxidation catalyst which causes the air-fuel mixture to undergo a catalytic combustion.
2. (Currently Amended) The fuel reforming device as defined in Claim 1, wherein the fuel reforming device further comprises a heater [(4)] which heats the fuel-air mixture, and a controller [(30)] functioning to control the heater [(4)] to heat the fuel-air mixture when the fuel reforming device starts operation [(S1)], and control an air supply amount of the first air distribution valve [(10)] to the fuel mixing chamber [(24)] to maintain an excess air factor of the air-fuel mixture in a predetermined lean state [(S4)].
3. (Currently Amended) The fuel reforming device as defined in Claim 2, wherein the fuel reforming device further comprises a sensor [(32)] which detects a temperature of the reformer [(5)], and the controller [(30)] further functions to determine whether or not the temperature of the reformer [(5)] is ascending in a state where the air-fuel mixture heated by the heater [(4)] is supplied to the reformer ~~(5)~~-(S7), and when the temperature of the reformer [(5)] is ascending, control the heater [(4)] to stop heating the air-fuel mixture [(S9)].

4. (Currently Amended) The fuel reforming device as defined in Claim 3, wherein the controller ~~[[30]]~~ further functions to determine whether or not the temperature of the reformer ~~[[5]]~~ is less than a predetermined temperature ~~[[S6]]~~, to increase a fuel injection amount of the fuel injector ~~[[1]]~~ with a preset increment ~~[[S4]]~~, to increase the air supply amount with a preset increment ~~[[S4]]~~, to determine whether or not an ascending rate of the temperature of the reformer ~~[[5]]~~ exceeds a predetermined rate in a state where the temperature of the reformer ~~[[5]]~~ is less than the predetermined temperature ~~[[S10]]~~, and when the ascending rate exceeds the predetermined rate, and to decrease the increment of the fuel injection amount and the increment of the air supply amount ~~[[S12]]~~.

5. (Currently Amended) The fuel reforming device as defined in Claim 4, wherein the controller ~~[[30]]~~ further functions, when the temperature of the reformer ~~[[5]]~~ is not less than the predetermined temperature, to decrease the air supply amount of the first air distribution valve ~~[[10]]~~ until the air excess factor of the air-fuel mixture reaches a predetermined rich state ~~(S107)~~, increase the air supply amount of the second air distribution valve ~~[[11]]~~ to the fuel mixing chamber ~~[[24]]~~ so as to compensate for the decrease of the air supply amount of the first air distribution valve ~~(10)~~ ~~(S106)~~, and then close the second air distribution valve ~~(11)~~ ~~(S16)~~.

6. (Currently Amended) The fuel reforming device as defined in Claim 1, wherein the fuel reforming device further comprises an air supply mechanism ~~[[9]]~~ which supplies air to the first air distribution valve ~~[[10]]~~ and the second air distribution valve ~~[[11]]~~, and a heat exchanger ~~[[6]]~~ which heats the air between the air supply mechanism ~~[[9]]~~ and the first air distribution valve ~~[[10]]~~ by performing heat exchange between the air and a gas discharged from the reformer ~~[[5]]~~.

7. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ ~~[[6]]~~, wherein the fuel reforming device further comprises an air supply mechanism ~~[[9]]~~ which supplies air to the first air distribution valve ~~[[10]]~~, and a carbon monoxide removal device ~~[[8]]~~ which removes carbon monoxide from the reformat gas by a catalytic reaction using air, the first air distribution valve ~~[[10]]~~ is configured to bifurcate the air supplied from the air supply mechanism ~~[[9]]~~ to the fuel mixing chamber ~~[[24]]~~ and the second air distribution valve ~~[[11]]~~, and the second air distribution valve ~~[[11]]~~ is configured

to bifurcate air supplied from the first air distribution valve [(10)] to the fuel mixing chamber [(24)] and to the carbon monoxide removal device [(8)].

8. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device is used together with a fuel cell stack [(14)] comprising an anode [(14A)] and a cathode [(14B)], and generating power by an electrochemical reaction between hydrogen in the reformat gas supplied to the anode [(14A)] and oxygen supplied to the cathode [(14B)], the fuel reforming device comprises an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], the first air distribution valve [(10)] is configured to bifurcate the air supplied from the air supply mechanism [(9)] to the fuel mixing chamber [(24)] and the second air distribution valve [(11)], and the second air distribution valve [(11)] is configured to bifurcate the air supplied from the first air distribution valve [(10)] to the fuel mixing chamber [(24)] and the anode [(14A)].

9. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device is used together with a fuel cell stack [(14)], comprising an anode [(14A)] and a cathode [(14B)], and generating power by the electrochemical reaction between hydrogen in the reformat gas supplied to the anode [(14A)] and oxygen supplied to the cathode [(14B)], and a combustor [(16)] which burns an anode effluent discharged from the anode [(14A)], the fuel reforming device comprises an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], the first air distribution valve [(10)] is configured to bifurcate the air supplied from the air supply mechanism [(9)] to the fuel mixing chamber [(24)] and the second air distribution valve [(11)], and the second air distribution valve [(11)] is configured to bifurcate the air supplied from the first air distribution valve [(10)] to the fuel mixing chamber [(24)] and the combustor [(16)].

10. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device is used together with a fuel cell stack [(14)] which generates electric power according to a power generation load using hydrogen in the reformat gas supplied by the fuel reforming device, and the fuel reforming device further comprises a heater [(4)] which heats the air-fuel mixture, a sensor [(34)] which detects the

power generation load, and a controller [(30)] functioning to calculate an increase amount of hydrocarbon fuel corresponding to an increase amount of the power generation load (~~S21, S22~~), to calculate a latent heat amount for vaporizing the increase amount of hydrocarbon fuel [(S23)], and to control the heater [(4)] to heat the air-fuel mixture for compensating the latent heat amount [(S24)].

11. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [6], wherein the fuel reforming device is used together with a fuel cell stack [(14)] which generates electric power according to a power generation load using hydrogen in the reformat gas supplied by the fuel reforming device, and the fuel reforming device further comprises an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], a sensor [(34)] which detects the power generation load, and a controller [(30)] functioning to calculate a first increase amount of hydrocarbon fuel corresponding to an increase amount of the power generation load (~~S21, S22~~), to calculate a latent heat amount for vaporizing the first increase amount of hydrocarbon fuel [(S23)], to calculate a second increase amount of hydrocarbon fuel for compensating the latent heat amount by a catalytic combustion of the second increase amount of hydrocarbon fuel, to increase a fuel injection amount of the fuel injector [(1)] according to the sum of the first increase amount of hydrocarbon fuel and the second increase amount of hydrocarbon fuel [(S31)], and to control the air supply mechanism [(9)] and the first air distribution valve [(10)] to increase an air supply amount to the fuel mixing chamber [(24)] according to an increased fuel injection amount by the fuel injector (~~S27, S31~~).

12. (Currently Amended) The fuel reforming device as defined in Claim 11, wherein the fuel reforming device further comprises a carbon monoxide removal device [(8)] which removes carbon monoxide from the reformat gas by a catalytic reaction using air, the first air distribution valve [(10)] is configured to bifurcate the air supplied from the air supply mechanism [(9)] to the fuel mixing chamber [(24)] and the second air distribution valve [(11)], the second air distribution valve [(11)] is configured to bifurcate air supplied from the first distribution valve [(10)] to the fuel mixing chamber [(24)] and the carbon monoxide removal device [(8)], and the controller [(30)] further functions to estimate a temperature ascending amount of the reformer from the increased fuel injection amount by the fuel injector [(1)] and an increased air supply amount to the fuel mixing chamber (~~(24) (S28)~~), to calculate a

generated amount of carbon monoxide in the reformer [(5)] corresponding to the increased fuel injection amount and the increased air supply amount [(S29)], and to control the air supply mechanism [(9)] and the second air distribution valve [(11)] to supply a required amount of air to the carbon monoxide removal device [(8)] which the carbon monoxide removal device [(8)] requires for removing carbon monoxide of the generated amount from the reformat gas.

13. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device further comprises a switch [(35)] which commands the fuel reforming device to start and stop operation, an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], and a controller [(30)] functioning, when the switch [(35)] has commanded the reforming device to stop operation, to stop injection of hydrocarbon fuel by the fuel injector (4)-(S44), and to maximize an air supply amount of the air supply mechanism (9)-(S42).

14. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device further comprises a switch [(35)] which commands the fuel reforming device to start and stop operation, an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], a heater [(4)] which heats the air-fuel mixture, and a controller [(30)] functioning, when the switch [(35)] has commanded the fuel reforming device to stop operation, to stop injection of hydrocarbon fuel by the fuel injector (4)-(S44), to maximize an air supply amount of the air supply mechanism [(9)], and to activate the heater [(43)] to heat the air-fuel mixture [(S43)].

15. (Currently Amended) The fuel reforming device as defined in ~~any one of Claim 1 through Claim~~ [(6)], wherein the fuel reforming device further comprises an air supply mechanism [(9)] which supplies air to the first air distribution valve [(10)], a heat exchanger [(6)] which warms an air supplied by the air supply mechanism [(9)] to the first air distribution valve [(10)] by heat exchange with the reformat gas, and a bypass passage [(23)] which connects the air supply mechanism [(9)] with the first air distribution valve [(10)] bypassing the heat exchanger [(6)].